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The moderating effects of direct and indirect experience on the attitude-behavior relation in the reasoned and automatic processing modes.

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THE MODERATING EFFECTS OF DIRECT AND INDIRECT EXPERIENCE ON THE ATTITUDE-BEHAVIOR RELATION IN THE REASONED AND AUTOMATIC PROCESSING MODES

A Thesis Presented

by

SARA POLLAK

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CHAPTER I

INTRODUCTION

Over the years, the "theory of reasoned action" (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and, more recently, the "theory of planned behavior" (Ajzen, 1988, 1991) have been the focus of over 250 empirical studies (Fishbein & Ajzen, 1993). It is fairly well accepted that these theories serve as good predictors of intention or performance of actual behavior. Yet the theory of planned behavior works on the implicit assumption that the processes involved with decision making are controlled; when individuals are required to make behavioral decisions, they weigh available information about the behavior. This information determines people's attitudes toward the behavior, their subjective norms (the perceived expectations of important others concerning performance of the behavior), and their perceptions of behavioral control (the extent to which they believe they have control over performing the behavior). These variables combine to determine an individual's intention to perform a given behavior, which, in turn, influences the behavioral outcome.

Fazio (1990) makes the claim that decision processes may be quite different in the case of attitudes which have been activated simply upon the mere observation of the attitude object. In his MODE model (i.e., Motivation and Opportunity as DEterminants of which processing mode will operate), Fazio makes a distinction between two types of processing modes: the automatic (or spontaneous) mode and the reasoned (or deliberative) mode. According to Fazio,

in order to function in the reasoned mode an individual must have the motivation and opportunity to retrieve or construct an appropriate attitude. In the automatic mode, on the other hand, attitudes mainly affect behavior by determining how an individual defines an event; Fazio holds that in the automatic mode attitudes color the manner in which people perceive a situation, making their perceptions more consistent with their attitude. Given that these resulting perceptions are congruent with attitudes, it is likely that an individual will produce attitudinally consistent behaviors. Thus according to Fazio's model, attitudes serve to mediate perceptions in the automatic mode of processing.

Fazio and his colleagues have conducted a number of studies in an attempt to examine the processing involved in the automatic activation of attitudes. The likelihood of an attitude's automatic activation, Fazio contends, depends on the chronic accessibility of the attitude, in other words, the extent to which the object and the evaluation are associated in memory. The more accessible an attitude, the more likely it will influence perception of the event and, through that perception, subsequent behavior. In a study by Fazio, Powell, and Williams (1989), subjects were asked to respond to the names of 100 products, including ten target items, by pressing a "like" or "dislike" button on the computer. This initial phase provided the experimenters with the subjects' latencies for the ten target items, and a basis for determining the accessibility of their attitudes toward those items. Subjects then made ratings of the 100 items on a 7-point scale which served as an attitude measure. Behavioral data were obtained by showing subjects

a table upon which had been placed the ten target items and allowing them to select five of the products as reimbursement for participating in the study. The experimenters found that the more accessible subjects' attitudes toward a given item, based on the latencies of responses made to each product on the computer, the more likely it was that their item selection behavior was consistent with their attitudes. A major question then arises as to what variables affect an attitude's level of accessibility. One possible moderating factor of attitude-behavior consistency proposed and studied by Fazio and his colleagues, has been the role of direct experience in the formation of attitudes (Fazio & Zanna, 1978a, 1978b; Sherman et al., 1982; Regan & Fazio, 1977). A number of studies have shown that prediction of behavior from self-reported attitudes tends to be stronger when the attitude is based on direct experience rather than on second-hand information. In a study by Regan and Fazio (1977), subjects were exposed to a number of different types of puzzles by either working through examples of the puzzles themselves (direct experience condition) or by having examples of the puzzles explained to them by the experimenter (indirect experience condition). All subjects indicated their attitudes toward each type of puzzle and then were given the opportunity to work the puzzles during a "free play" period. The experimenters found that subjects who had had direct experience with the puzzles prior to the free play situation showed greater consistency between their attitudes and their free play behavior than did subjects in the indirect experience condition. These findings correspond to another set of studies conducted by Fazio in which

he found that subjects responded more quickly in a reaction-time task to questions about their attitudes when those attitudes had been based on direct behavioral experience rather than indirect experience (Fazio, Powell, & Herr, 1983). Fazio suggests that direct experience both facilitates the attitude formation process and increases attitude accessibility once the attitude is formed. Yet accessibility may not be the only factor coming into play in direct experience. Attitudes based on direct experience rely on more accurate information, so they are better defined, held with more confidence, and therefore more stable over time. These factors have not been held constant in Fazio's work. It is possible that the stability of the attitude may be responsible for the moderating effect of direct experience on the attitude-behavior relation rather than accessibility (see Doll & Ajzen, 1992).

The MODE model suggests that type of experience with an attitude object (direct vs. indirect experience) should moderate the attitude-behavior relation primarily in the automatic processing mode. Based on Fazio's work with accessibility, it should be under these circumstances that attitudes formed via direct experience will be automatically activated, whereas those attitudes formed via indirect experience will not be activated. In the reasoned action mode, Fazio's MODE model predicts that attitudes based on direct experience rather than indirect experience will show no significant differences in their attitude-behavior relations due to the controlled processes involved with this mode; automatic activation should not play an important role in this mode.

Ajzen has recently begun constructing a new model which makes some predictions opposite from Fazio's model (Doll & Ajzen, 1992; Ajzen, 1993). Ajzen predicts that in the reasoned action mode, individuals consider all available information regarding the attitude object. Attitudes that are formed by way of direct experience are generally based on more accurate information regarding behavioral consequences, expectations of important others, and difficulties involved with the behavior than are those attitudes formed strictly on the basis of indirect, or second-hand, experience. Given the increased accuracy of knowledge gained from direct experience with an attitude object, these attitudes will tend to be much more stable upon performance of the behavior, whereas attitudes formed via indirect experience will be much more likely to change with the addition of new information. In the automatic mode of processing, the advantages of direct experience cannot be fully accessed due to lack of motivation or ability on the part of an individual; the specific type of experience with the attitude object will have much less of an effect on the attitude-behavior relation.

The following study was designed to test these two opposing sets of predictions. The design of this study is very similar to the design used in the Regan and Fazio (1977, study 2) study previously described, with the addition of a second independent variable: level of cognitive load. Cognitive load was manipulated by asking subjects to count the number of beeps they heard from a tape recorder. The number of beeps subjects heard per minute was designed to determine the level of cognitive load. This variable was included in order to

restrict processing to the automatic mode in the high cognitive load condition so that we could compare the attitude-behavior relation in this condition to the relations in the low cognitive load and no cognitive load, or reasoned action, conditions. Subjects were exposed to a set of five puzzles by either solving examples of each type of puzzle themselves (direct experience condition) or having the experimenter explain each type of puzzle to the subject (indirect experience condition). Following their exposure to the puzzles, subjects completed a questionnaire on the computer regarding their level of perceived knowledge about each puzzle type, the individual aspects of the theory of planned behavior (attitude toward the specific puzzle types, perceived behavioral control, expectancies of important others, intentions), and their level of confidence concerning their judgments. Latencies of subjects' responses to the questionnaire were recorded by the computer.

Following completion of the questionnaire, subjects were given three separate pages of each type of puzzle. They were told that they would have 15 minutes in which to attempt any of the puzzles they wish. They were asked to number each item as it was attempted. The percentage of each type of puzzle attempted and the order in which the puzzles were attempted served as our behavioral measures. In the high and low cognitive load conditions, subjects were advised that while they were working on the puzzles, beeping noises would be emitted by a tape recorder located on the table next to them. They were asked to keep track of the number of beeps they heard while working on the puzzles. In

order to be certain that subjects in the high cognitive load condition were not behaving differently from subjects in the no cognitive load condition simply based on the fact that they are completing an additional task, we included a low cognitive load condition. Subjects in the high cognitive load condition heard a significantly greater number of beeps than those in the low cognitive load condition. Subjects in the no cognitive load condition did not hear any beeps. Both the low and no cognitive load conditions served as our reasoned processing modes, while the high cognitive load condition served as our automatic processing mode. In order to assess the temporal stability of subjects' attitudes, following the free play situation subjects were seated at the computer and again asked about their attitudes toward each individual puzzle type.

This study tested two opposing sets of predictions. Both the Ajzen model and Fazio's MODE model predict main effects of experience such that subjects in the direct experience condition will display a significantly stronger attitude-behavior relation than subjects in the indirect experience condition. Additionally, the Ajzen model predicts a main effect of cognitive load, wherein subjects in the low cognitive load and no cognitive load conditions, our reasoned action conditions, will show a significantly stronger attitude-behavior relation than subjects in the high cognitive load condition, our automatic processing condition. The MODE model also predicts a main effect of load, but with subjects in the high cognitive load condition showing a significantly stronger attitude-behavior relation than subjects in the no and low cognitive load conditions. Finally, the

Ajzen model predicts an interaction effect such that direct experience will have greater effects on the attitude-behavior relation for attitudes retrieved by subjects under the low or no cognitive load conditions than for those attitudes retrieved by subjects in the high cognitive load condition. The MODE model also predicts an interaction effect, but wherein direct experience has a greater effect on the attitude-behavior relation for attitudes retrieved by subjects under high cognitive load conditions than for those attitudes retrieved under no and low cognitive load conditions (see Figure 1).

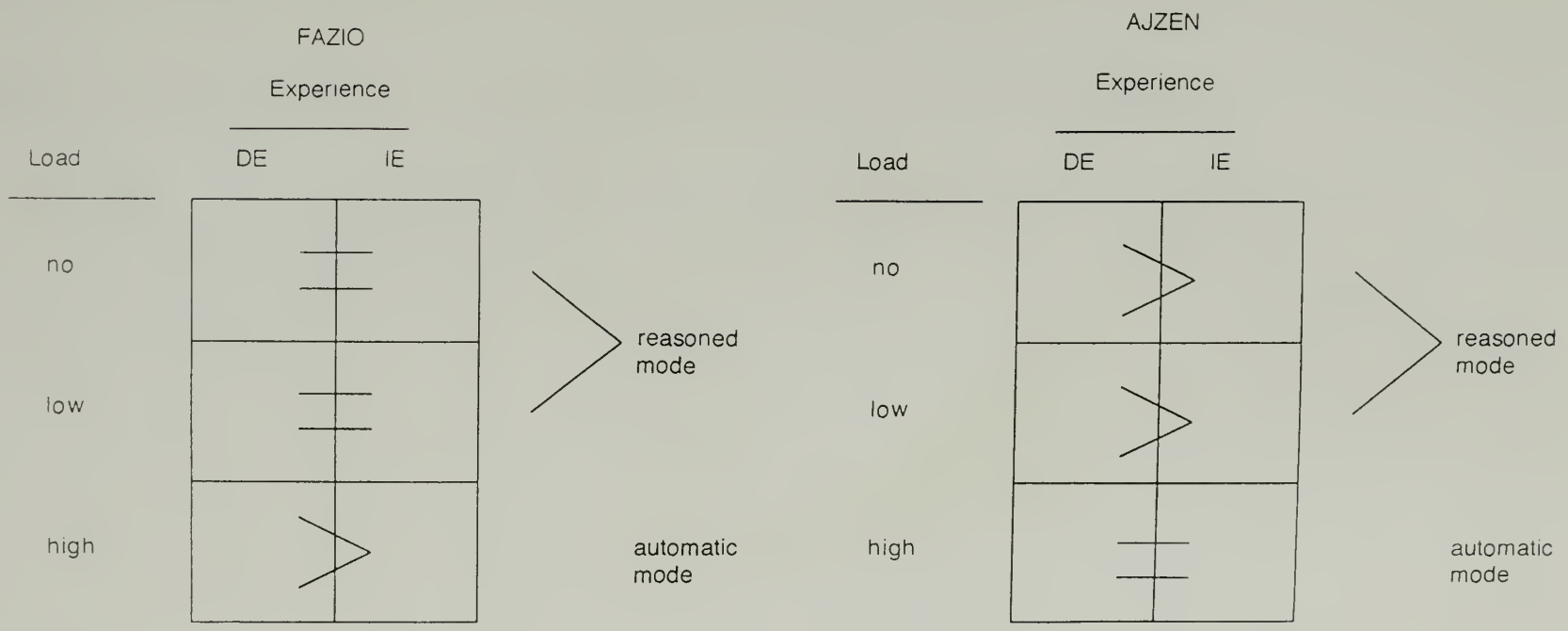


Figure 1. Predicted Influence on the Attitude-Behavior Relation. Predicted effects of experience on the attitude-behavior relation in the reasoned and automatic processing modes.

CHAPTER II

METHOD

Subjects

108 undergraduate students at the University of Massachusetts participated in this experiment in partial fulfillment of class requirements. The participants were assigned to one of six between-groups experimental conditions in a 2 (direct vs. indirect experience) X 3 (high cognitive load vs. low cognitive load vs. no cognitive load) design.

Procedure

Upon entering the experimental laboratory, subjects completed a consent form describing the study in which they would be participating:

> "You will be reviewing some puzzle exercises for a new aptitude test that we are developing for a masters project. You will be asked a number of questions about the puzzles and then given a free-play session where you may choose to complete any of the puzzles you wish."

The experimenter told subjects in the high and low cognitive load conditions that they would hear beeping noises coming from the tape recorder on the table during the "free play" period. As a demonstration, a sixty-second portion of each tape (high or low cognitive load) was played for subjects in the cognitive load conditions.

The experimenter then presented subjects with samples of the five types of problems included in this study. Puzzle materials were similar to those utilized in

a study by Regan and Fazio (1977, study 2). These materials consisted of five types of puzzles: (1) word dials, in which the subject must identify the letter missing from a word; (2) choosing a path, in which the subject must find the correct path from a starting point, through a center point, to a finishing point; (3) cube comparisons, in which the subject must determine whether a set of cubes is identical; (4) squares, in which subjects must identify the word contained within a square; and (5) gestalt completions, in which subjects must identify an object that is only partially drawn (see Appendix A for examples of puzzles). Order of presentation of the puzzles was randomized.

The experimenter gave five pages of problems one at a time to the subjects. Each page presented examples of one type of problem and instructions on how the puzzle was to be completed. For subjects in the direct experience condition, the examples were left blank and the experimenter asked them to "get acquainted" with each type of problem by solving the examples provided. Subjects in the indirect experience condition viewed the same examples, but the examples given to these subjects had already been completed. The experimenter attempted to provide subjects with equivalent time for exposure to the puzzles in both conditions. Subjects in the direct experience condition were told to "take about three minutes" to solve the examples. Likewise, the experimenter spent three minutes explaining and demonstrating the examples to subjects in the indirect experience condition.

Following exposure to all five types of problems, the experimenter left the room and was replaced by a second experimenter who was blind to subjects' experience condition. This procedure was used to avoid experimenter bias from occurring due to the extensive interaction between the experimenter and the subject during the experience manipulation.

The experimenter directed all subjects to answer a series of questions on the computer regarding the problems they just completed. The experimenter asked subjects to respond to the questions on the screen as quickly and as accurately as possible. The experimenter advised subjects to rate the type of puzzles they had just seen, not the specific examples that were given for each puzzle type. The experimenter reminded subjects that, following the completion of these questions, they would be allowed a period of time during which they would be free to work on any of the puzzles they wish. All questions on the computer were answered on 5-point scales.

The first question asked subjects how informed they felt about each type of puzzle ("I feel very informed about how to work on puzzle X" *very true-very untrue*). The next set of questions measured the variables contained within the theory of planned behavior. The order of the variables was randomized.

Attitudes toward playing with each of the puzzles were measured by means of two evaluative scales ("My working on puzzle X will be" *extremely pleasant-extremely unpleasant* and *extremely interesting-extremely boring*). Subjective norms were measured in the following manner: "The experimenter

would especially approve of my working on puzzle X", "The experimenter thinks I should work especially on puzzle X", "People like me would most like to work on puzzle X", and "My friends would especially approve of my working on puzzle X" *extremely likely-extremely unlikely.* Perceived behavioral control was measured by means of two items ("For me, working on puzzle X will be" *extremely easy-extremely difficult* and "I will be able to work successfully on puzzle X" *extremely likely-extremely unlikely*). Lastly, intention was measured by means of two items ("I intend to work on puzzle X in the time provided" and "I am planning to work on puzzle X the most often in the time provided" *extremely likely-extremely unlikely*).

The last two questions asked subjects about their feelings of confidence regarding their judgments about each of the puzzles and their overall evaluations after receiving information about the puzzles ("I feel confident about my judgments concerning puzzle X" and "I feel good about the idea of working on these types of puzzles in the free play period" *very true-very untrue*).

The experimenter placed samples of the five types of puzzles accompanied by the puzzle names next to the computer so that subjects were able to identify the puzzle type referred to in the questions presented by the computer. The computer presented each type of question five times in a row, once for each puzzle type, along the 5-point rating scale. Each type of question was separated by filler questions. The order of the presentation of the puzzle types for all questions was randomized (see Appendix B).

Following the completion of the questionnaire, the experimenter gave subjects three separate sheets of each of the five types of puzzles. The experimenter told subjects:

> "You will have 15 minutes in which to work any of the puzzles you choose. This is a totally free period and you should not be worried about being able to actually solve a puzzle. You should feel free to work on any of the puzzles that you wish."

These last statements were included in order to prevent subjects from attempting only those puzzles they felt they were likely to be able to complete successfully. The experimenter asked the subjects to number each particular problem as it was attempted.

The experimenter advised high and low cognitive load subjects that while they were working on the puzzles, beeping noises would be emitted by a tape recorder on the table next to them. Subjects in the high and low load conditions were told:

> "As part of the aptitude test we are developing, we are looking at how well people are able to perform two tasks at the same time. We would like you to keep track of the number of beeps you hear coming from the tape recorder on the table while working on the puzzles. I will be asking you to tell me the number of beeps that you heard at the end of this 15 minute period."

The high cognitive load subjects heard significantly more beeps than the low cognitive load subjects (approximately 9 beeps per minute vs. 6 beeps per minute). The experimenter pretested specific rates of beeps per minute in order to ensure

full cognitive load in the high cognitive load subjects. Subjects in the no cognitive load condition did not hear any beeps.

Following these instructions, the experimenter allowed the subject to work on the puzzles for 15 minutes. The free play session provided the experimenter with two measures of behavior: the percentage of each type of problem attempted, as well as the order in which subjects attempted the different types of puzzles.

In order to obtain a measure of the temporal stability of subjects' attitudes toward the individual puzzles, the experimenter asked subjects to return to the computer after the free play session to answer questions similar to those presented in the first questionnaire regarding their attitude towards playing with each of the individual puzzles and their level of enjoyment during the free play period. Following the completion of this second questionnaire, the experimenter thoroughly debriefed the subjects.

CHAPTER III

RESULTS

2 (direct experience vs. indirect experience) x 3 (no cognitive load vs. low cognitive load vs. high cognitive load) analyses of variance (ANOVAs) were used to test the primary hypotheses of this study. These two sets of hypotheses are as follows: the Ajzen model predicts that (1) attitudes based on direct experience will predict behavior better than attitudes formed through indirect experience, (2) the attitude-behavior relation will be stronger for subjects in the no and low cognitive load conditions than for subjects in the high cognitive load condition, and (3) the effects of direct experience on the attitude-behavior relation will be greater for attitudes retrieved under no or low cognitive load than for attitudes retrieved under high cognitive load; Fazio's MODE model predicts that (1) attitudes based on direct experience will predict behavior better than attitudes formed through indirect experience, (2) the attitude-behavior relation will be stronger for subjects in the high cognitive load condition than for subjects in the no and low cognitive load conditions, and (3) the effects of direct experience on the attitude-behavior relation will be greater for attitudes retrieved under high cognitive load than for attitudes retrieved under no or low cognitive load (see Figure 1). The percentage of each type of puzzle attempted, as well as the order in which subjects attempted each type of puzzle served as the dependent variables in these analyses.

Preliminary Analyses

Cognitive Load

This study differs from the Regan and Fazio (1977) study mainly due to the inclusion of a second independent variable: cognitive load. In order to conceptualize the automatic processing mode, subjects in the high cognitive load condition were exposed to a greater number of beeps than subjects in both the no and low cognitive load conditions.

Based on pretesting, subjects in the low cognitive load condition received approximately 6 beeps per minute for a total of 88 beeps (subject M = 87.889), while subjects in the high cognitive load condition received approximately 9 beeps per minute for a total of 114 beeps (subject M = 118.333). The number of beeps that busy subjects reported hearing was compared to the actual number of beeps played. The average error rate was 7.6% for subjects in the low cognitive load condition and 13.2% for subjects in the high cognitive load condition. The acceptable error rate in other cognitive load experiments has been 15% (Gilbert, Krull, & Pelham, 1988).

Level of Information

To rule out possible artifacts due to differing amounts of information subjects may have had regarding the different puzzle types, a 2 (type of experience) X 3 (level of cognitive load) ANOVA was performed on subjects' self-reports of how informed they felt about each type of puzzle after having

received the direct or indirect experience manipulation. A significant main effect of Experience $F(1, 102) = 13.132$, $p<.000$, was found (see Figure 2). Subjects in the indirect experience condition felt more informed than subjects in the direct experience condition ($M = 4.33$ vs. 3.87). This difference was nonsignificant in both the no and low cognitive load conditions (Indirect Experience $M = 4.30$, Direct Experience $M = 3.99$; $t(34) = 1.422$, ns; Indirect Experience $M = 4.26$, Direct Experience $M = 3.97$, $t(34) = 1.33$, ns) but was highly significant in the high load condition (Indirect Experience $M = 4.43$, Direct Experience $M = 3.67$; $t(34) = 3.486$, $p<.01$). T-tests were adjusted with Scheffé's procedure in order to control for family-wise error rate. The finding that indirect experience subjects felt more informed about the puzzles than direct experience subjects was unexpected. In Regan and Fazio's (1977) study, they found no differences between direct and indirect experience subjects in how informed they felt about the various types of puzzles. It is possible that because indirect experience subjects had only superficial exposure to the puzzles, they were not fully aware of any intracacies involved in solving the puzzles. Therefore, indirect experience subjects were not reticent to indicate that they felt informed about the puzzles. Alternatively, direct experience subjects, having had first-hand experience with the puzzles, may have felt more aware of any gaps in their knowledge about the puzzles, and therefore indicated feeling less informed.

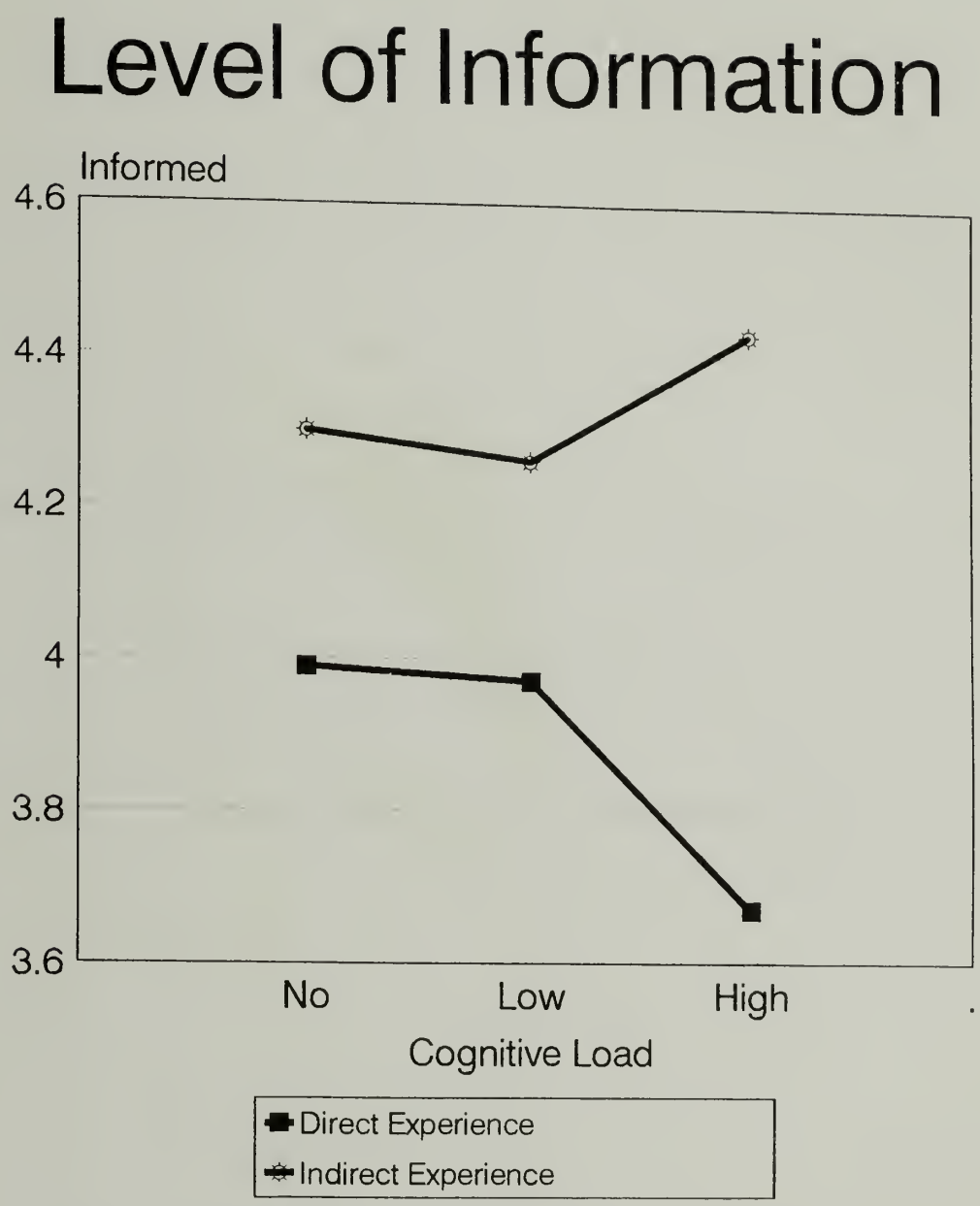


Figure 2. Level of Information. Measure of how informed subjects felt after receiving the experience manipulation.

Confidence

Based on the research of Fazio and Zanna (1978b) we expected to find a main effect of experience on subjects' reported confidence in their judgments such that direct experience subjects would report being more confident than indirect experience subjects. This is, in fact, what we found. A 2 (type of experience) X 3 (level of cognitive load) ANOVA performed on subjects' reported level of confidence in their judgments regarding each of the puzzle types revealed a main effect of experience $F(1, 102) = 9.054$, $p<.003$, with direct experience subjects reporting higher levels of confidence than indirect experience subjects ($M = 3.86$ vs. $M = 3.48$) (see Figure 3). Although the overall Experience x Cognitive Load interaction was not significant $F(2,102) = 1.209$, $p<.303$, type of experience had a marginally significant effect only in the no cognitive load condition, wherein direct experience subjects reported being more confident in their judgments than indirect experience subjects (Direct Experience $M = 3.99$, Indirect Experience $M = 3.48$; $t(34) = 2.80$, $p<.06$).

The finding that direct experience subjects felt more confident than indirect experience subjects is consistent with past research, although it seems somewhat at odds with the results previously reported regarding how informed the subjects felt. Those results indicated that direct experience subjects felt significantly less well-informed than indirect experience subjects.

Figure 3. Confidence. Effects of experience and cognitive load on subjects' levels of confidence in their own judgments.

Filler Items

Filler items were included in the pre- and posttest questionnaires in order to control error variance due to individual differences in speed of responding that were unrelated to accessibility (Fazio, 1990). The distributions of subjects' response latencies were found to be positively skewed, so we followed the procedure suggested by Fazio (1990) and subjected the recorded latencies to logarithmic transformations. All data analyses were performed on the transformed scores.

A 2 X 3 X 2 multivariate analysis of variance (MANOVA) on the filler latencies, with type of experience and cognitive load as between-subject factors and time of measurement (pre- or posttest questionnaire) as a within-subjects factor revealed a main effect of Time $(1,102) = 3.94$, $p<.05$, as well as a significant Experience x Time interaction $F(1,102) = 8.87$, $p<.004$. The main effect of Time is most likely due to practice effects, as examination of subjects response times indicate longer latencies on the pretest than the posttest ($M = 1.477$ vs. $M = 1.443$) Filler latencies differed significantly by type of experience only on the pretest (Direct Experience $M = 1.5297$ vs. Indirect Experience $M = 1.4245$); mean latencies were virtually equal on the posttest (Direct Experience $M = 1.443$ vs. Indirect Experience $M = 1.442$). These results were unexpected, for the filler items were designed to be irrelevant to the puzzle task, used only to control for individual differences, so it is unclear why type of experience should

have had a significant effect on subjects' filler latencies on the pretest. Nevertheless, once all of the subjects had an opportunity to work on the puzzles during the free play period, this difference disappeared.

Attitude Items

Based on past research (Fazio, Powell, & Herr, 1983), we expected to find a main effect of experience on attitude accessibility, with direct experience subjects responding more quickly than subjects in the indirect experience condition.

To obtain an overall measure of attitude accessibility, the logarithms of the response latencies for the two indicators of attitude were averaged across the five puzzles. Before averaging the two attitude measures, we tested for internal consistency. A between-subjects analysis was used to test for consistency because only one averaged response latency measure was available for each subject. The correlation between attitude measures on the pretest was .7365 ($p<.01$) and on the posttest was .6241 ($p<.01$).

A 2 (type of experience) X 3 (level of cognitive load) X 2 (time of measurement) MANOVA was was performed to test the effects of type of experience and cognitive load on the accessibilty of subjects' attitudes. The dependent variable in the analysis was the mean latency of subjects' attitude responses toward the five puzzle types. Significant main effects of Experience $F(1,102) = 5.38$, $p<.022$, and Time $F(1,102) = 57.68$, $p<.000$, were revealed. The

main effect of Experience indicated that direct experience subjects showed somewhat longer response latencies than indirect experience subjects (M = 1.218 vs. 1.088). These results were unexpected, as work by Fazio, Powell, and Herr (1983) demonstrated shorter response latencies for subjects with direct experience rather than indirect experience. The main effect of Time indicated that all subjects showed longer mean response latencies on the pretest than on the posttest (M = 1.267 vs. 1.038). As discussed earlier, it is likely that subjects response times shortened on the posttest simply due to practice effects.

The same analysis was conducted with filler latencies treated as a covariate in order to control for systematic differences as well as for individual differences in responding. Controlling for differences in filler latencies produced similar results to the previous analysis: a main effect of Experience $F(1,101) = 3.94$, $p<.05$, with direct experience subjects responding slower than indirect experience subjects, and a main effect of Time $F(1, 101) = 57.68$, $p<.000$, with mean adjusted response latencies being longer during the pretest than the posttest.

Summary

This study found a main effect of Time as well as an Experience x Time interaction on subjects' response latencies to the filler items. Overall, subjects responded more slowly on the pretest than on the posttest. This effect is most likely due to practice effects. Filler latencies differed by type of experience only on the pretest, with subjects in the indirect experience condition responding more

quickly than the direct experience subjects. Once subjects in the direct and indirect conditions were allowed the chance to work on the puzzles themselves (i.e., direct experience), this difference disappeared.

In addition, main effects of Time and Experience on the accessibility of subjects' attitudes were found, even when filler latencies were treated as a covariate. Subjects took longer to respond to questions on the pretest than to questions on the posttest. As suggested above, this effect may simply be a case of practice effects. More unexpected though, is the finding that indirect experience subjects responded more quickly than direct experience subjects. Previous studies have demonstrated shorter response latencies for direct experience subjects as compared to subjects with indirect experience and, in fact, the opposite result was found in the present study.

Temporal Stability of Attitudes

The temporal stability of subjects' attitudes was assessed with respect to two dependent variables: a global attitude measure toward the puzzles and a specific measure of attitudes toward each individual puzzle. We expected that subjects in the direct experience condition would display more stable attitudes toward the puzzles than subjects in the indirect experience condition.

The temporal stability of subjects' global attitudes was assessed by computing the absolute difference between subjects' overall evaluations on the pre- and posttest questionnaires. A 2 (type of experience) X 3 (level of cognitive

load) ANOVA revealed a main effect of Experience, $F(1, 102) = 9.336$, $p<.003$ (see Figure 4). Overall, the global attitudes of subjects in the indirect experience condition were more stable than those of subjects in the direct experience condition ($M = .33$ vs. $.72$), scores closer to zero being more stable. This difference was marginally significant in the high load condition (Indirect Experience $M = .28$, Direct Experience $M = .89$; $t(34) = 2.77$, $p<.07$). The results of the mood measure were not consistent with our predictions yet, similar to the results found with subjects' reported levels of information regarding the puzzles, the greatest difference between subjects in the direct and indirect experience conditions occurred under high cognitive load conditions.

The temporal stability of subjects' specific attitudes towards the different puzzles was assessed by computing the within-subject correlations between the pre- and posttest measures of subjects' attitudes across the five puzzles[1]. All statistical analyses involving these stabilities were performed after the correlations had been submitted to Fisher's r-to-z transformation. A 2 (type of experience) x 3 (level of cognitive load) ANOVA again revealed a main effect of Experience, $F(1,78) = 6.518$, $p<.013$ (see Figure 5). However, in this case subjects in the direct experience condition displayed more stable attitudes than subjects in the indirect experience condition ($M = .87$ vs. $.51$), scores closer to one being more stable. This difference was particularly evident in the high cognitive load

[1] We were unable to use within-subject correlations for the analysis of our global attitude measure as we had taken only one set of measures per subject.

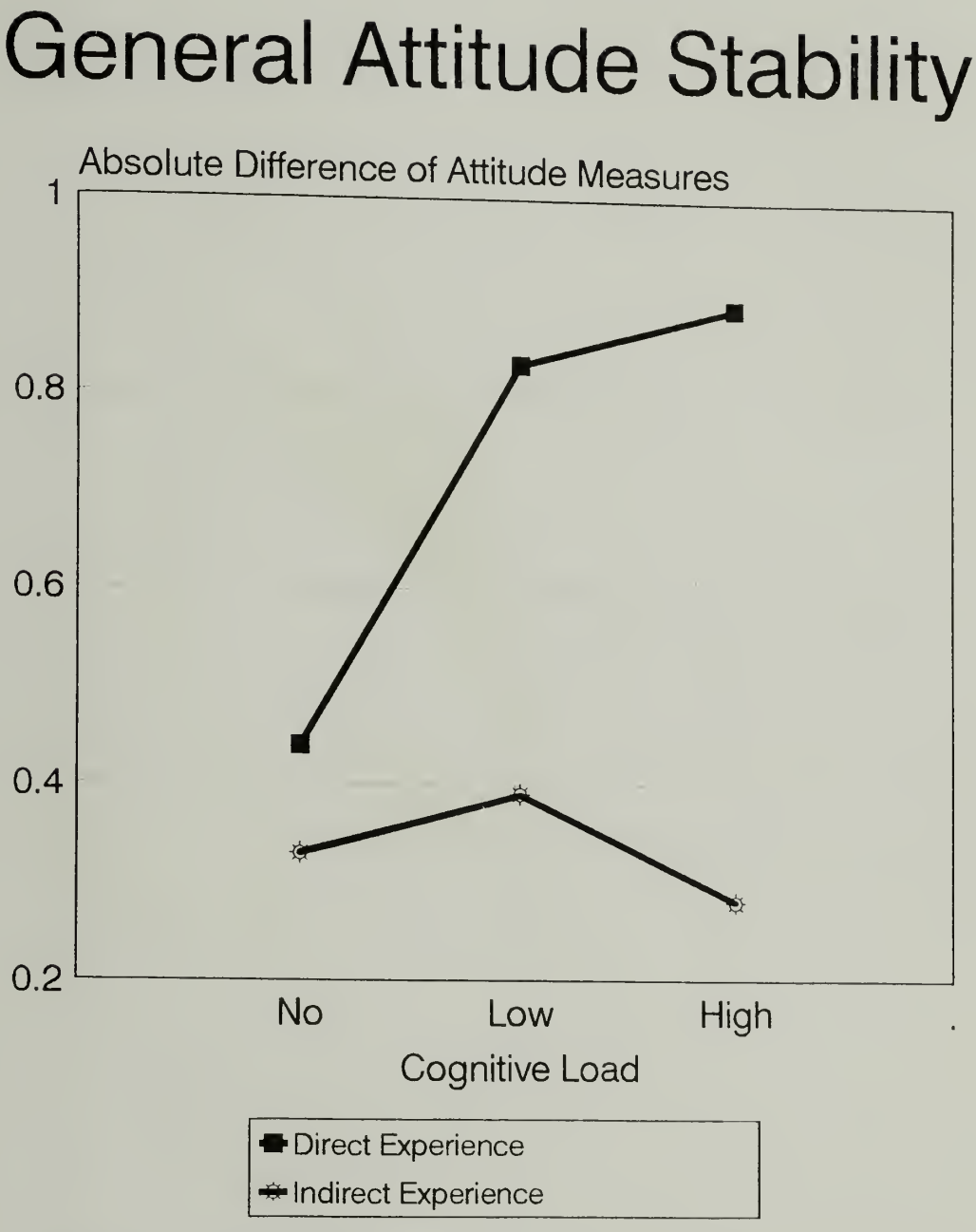


Figure 4. General Attitude Stability. Effects of experience and cognitive load on subjects' general attitudes. Values closer to zero indicate less change.

condition, although the results did not reach significance (Indirect Experience M = .33, Direct Experience M = .91; $z = 2.639$, $p<.10$). These analyses are consistent with our hypothesis that subjects who have direct experience with an attitude object develop more stable attitudes than subjects who have indirect experience. Again we see a similar pattern of results to those shown by the general evaluation and level of information variables, namely a distinct separation between the direct and indirect experience subjects occurring only under conditions of high cognitive load.

Attitude-Behavior Relation

Our primary hypothesis concerned the effects of type of experience and level of cognitive load on the relation between subjects' attitudes and their subsequent behavior. This study was designed to test the opposing hypotheses proposed by Ajzen and Fazio's models. Both models predict a main effect of experience such that subjects in the direct experience condition will display a significantly stronger attitude-behavior relation than subjects in the indirect experience condition. Ajzen's model also predicts a main effect of cognitive load, wherein subjects in the no and low cognitive load conditions will show a significantly stronger attitude-behavior relation than subjects in the high cognitive load condition. Fazio's MODE model also predicts a main effect of load, but with subjects in the high cognitive load condition showing a stronger attitude-behavior relation than subjects in the no and low cognitive load conditions. Finally, the

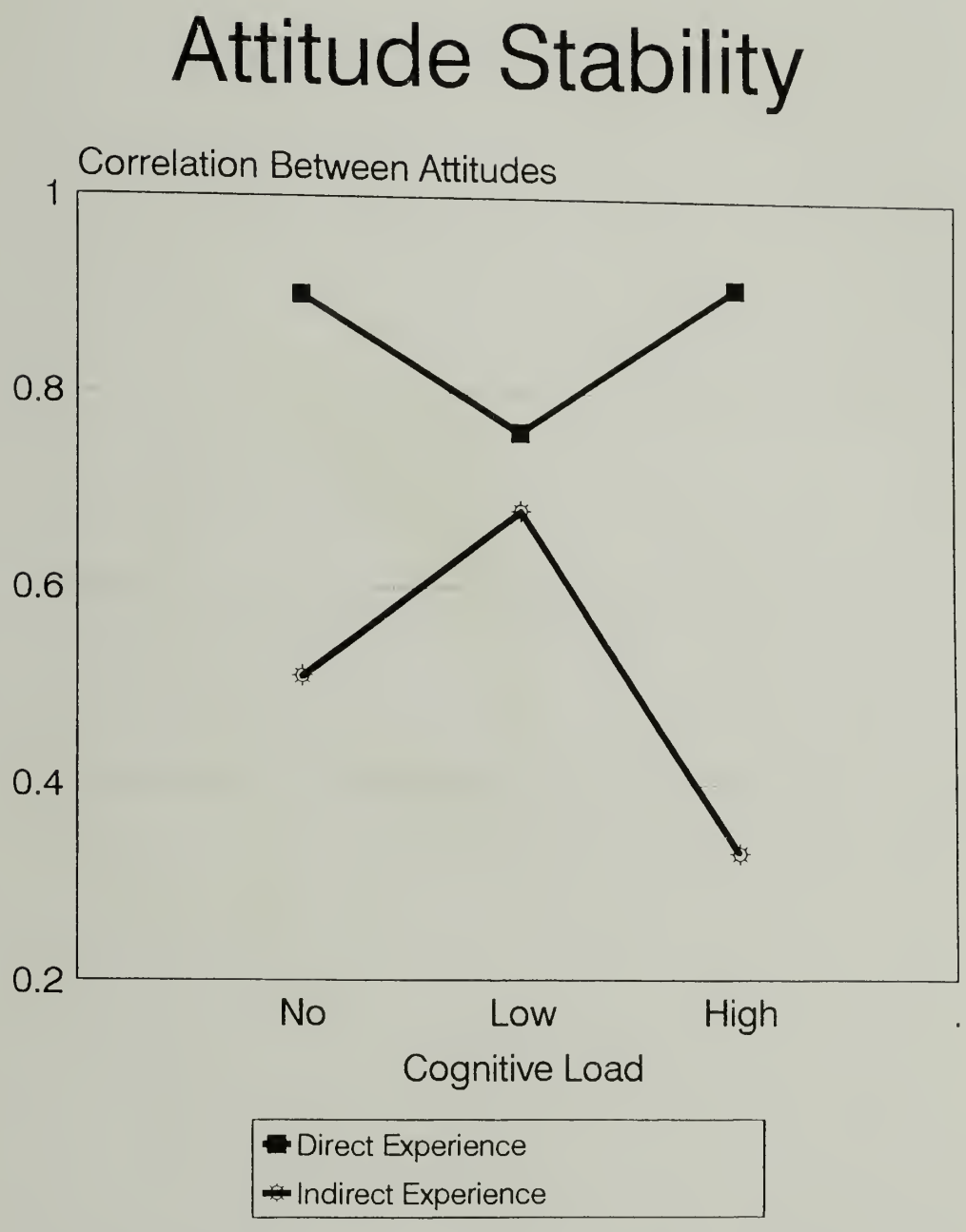


Figure 5. Attitude Stability. Correlations between pre- and posttest attitudes. Values closer to one indicate less change.

Ajzen model predicts an interaction such that direct experience will have a greater effect on the attitude-behavior relation for attitudes retrieved under no and low cognitive load conditions than for those attitudes retrieved under high cognitive load conditions. Again, Fazio's model also predicts an interaction effect between cognitive load and type of experience, but wherein direct experience has a greater effect on the attitude-behavior relation for attitudes retrieved under high load conditions than for attitudes retrieved under no and low cognitive load conditions (see Figure 1).

The attitude-behavior relation was assessed by computing the within-subject correlations of attitude and behavior across the five puzzle types. Separate correlations were computed for each of the dependent measures of puzzle behavior: order in which the puzzles were completed, and percentage of each type of puzzle completed. All statistical analyses involving these correlations were performed after the correlations had been submitted to Fisher's r-to-z transformation.

The transformed attitude-behavior correlations were submitted to a 2 (type of experience) X 3 (level of cognitive load) ANOVA. The analysis involving the relation between attitudes and order of puzzle completion produced a main effect of Experience $F(1,85) = 4.991$, $p<.028$, and a significant interaction $F(2,85) = 3.279$, $p<.042$ (see Figure 6). Analysis of the correlation between attitudes and the percentage of each type of puzzle completed by subjects produced a similar, though nonsignificant, pattern of results (Experience x Load interaction $F(2, 85) =$

1.542, p<.220; Figure 7). Contrary to both models, there was no main effect of cognitive load with either dependent variable ($F < 1$). Consistent with predictions derived from Fazio and Ajzen, subjects in the direct experience condition displayed stronger attitude-behavior relations than did subjects in the indirect experience condition (puzzle order: M = .41 vs. .16; percentage of puzzles: M = .61 vs. .51). The effect due to experience was particularly evident in the high cognitive load condition (puzzle order: Direct Experience M = .51, Indirect Experience M = -.12; percentage of puzzles: Direct Experience M = .65, Indirect Experience M = .23), although these differences did not reach statistical significance (puzzle order: z = 1.666, ns; percentage of puzzles: z = 1.32, ns). These interactions support Fazio's model. The results concerning the strength of the attitude-behavior relation demonstrate a trend similar to the results of other analyses in this study; the greatest differences between the direct and indirect experience conditions are produced under high cognitive load.

Mediation

Past research has found a stronger attitude-behavior relation when attitudes are based on direct experience rather than indirect experience (Fazio & Zanna, 1978a, 1978b; Regan & Fazio, 1977). This main effect of experience is presented in the previous section. Fazio and his associates (Fazio, 1990; Fazio, Chen, McDonel, & Sherman, 1982; Fazio & Williams, 1986) have suggested that the effects of experience on the attitude-behavior relation are mediated by the

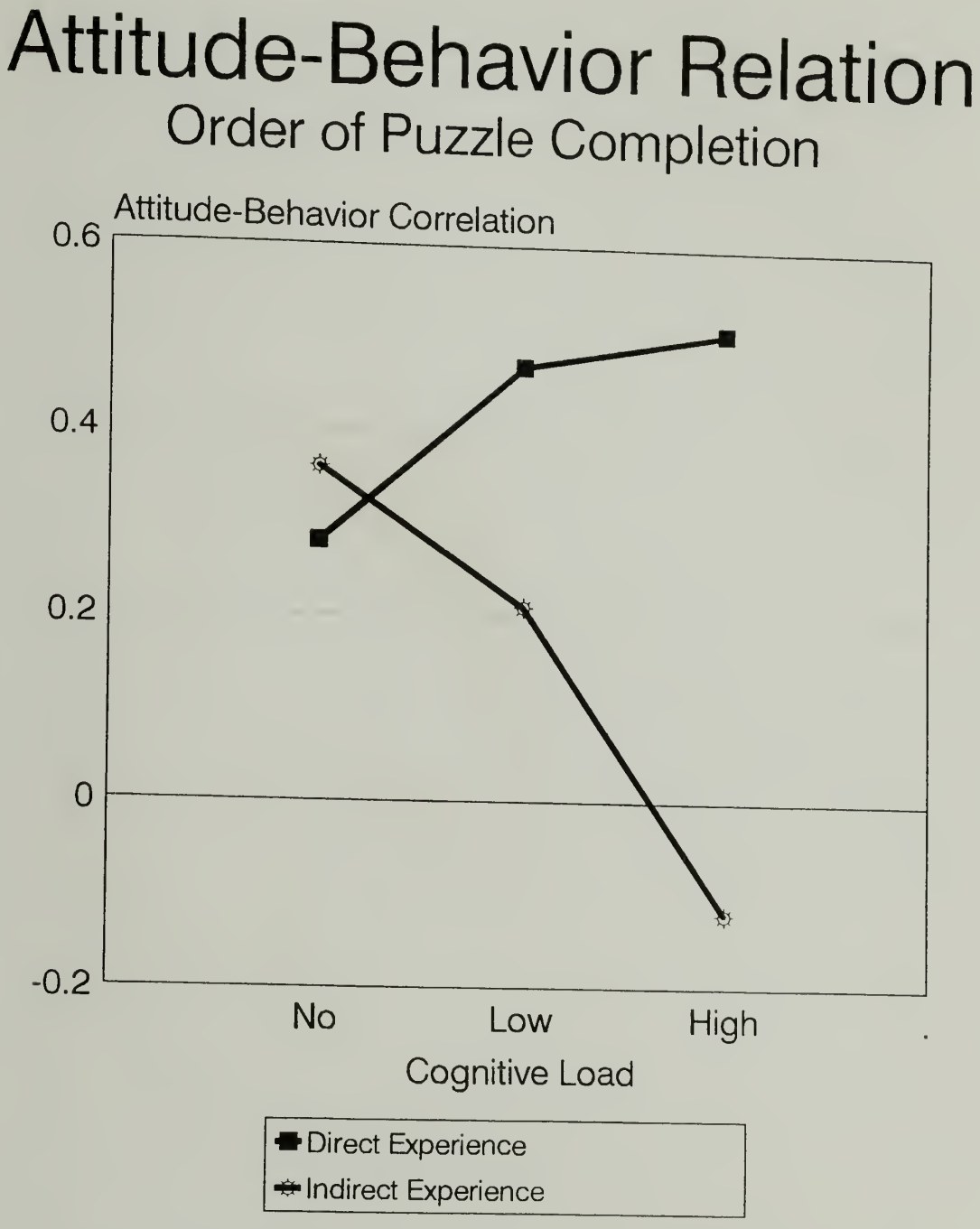


Figure 6. Attitude-Behavior Relation: Order of Puzzle Completion. Correlations between pretest attitudes and subsequent behavior as related to experience and cognitive load.

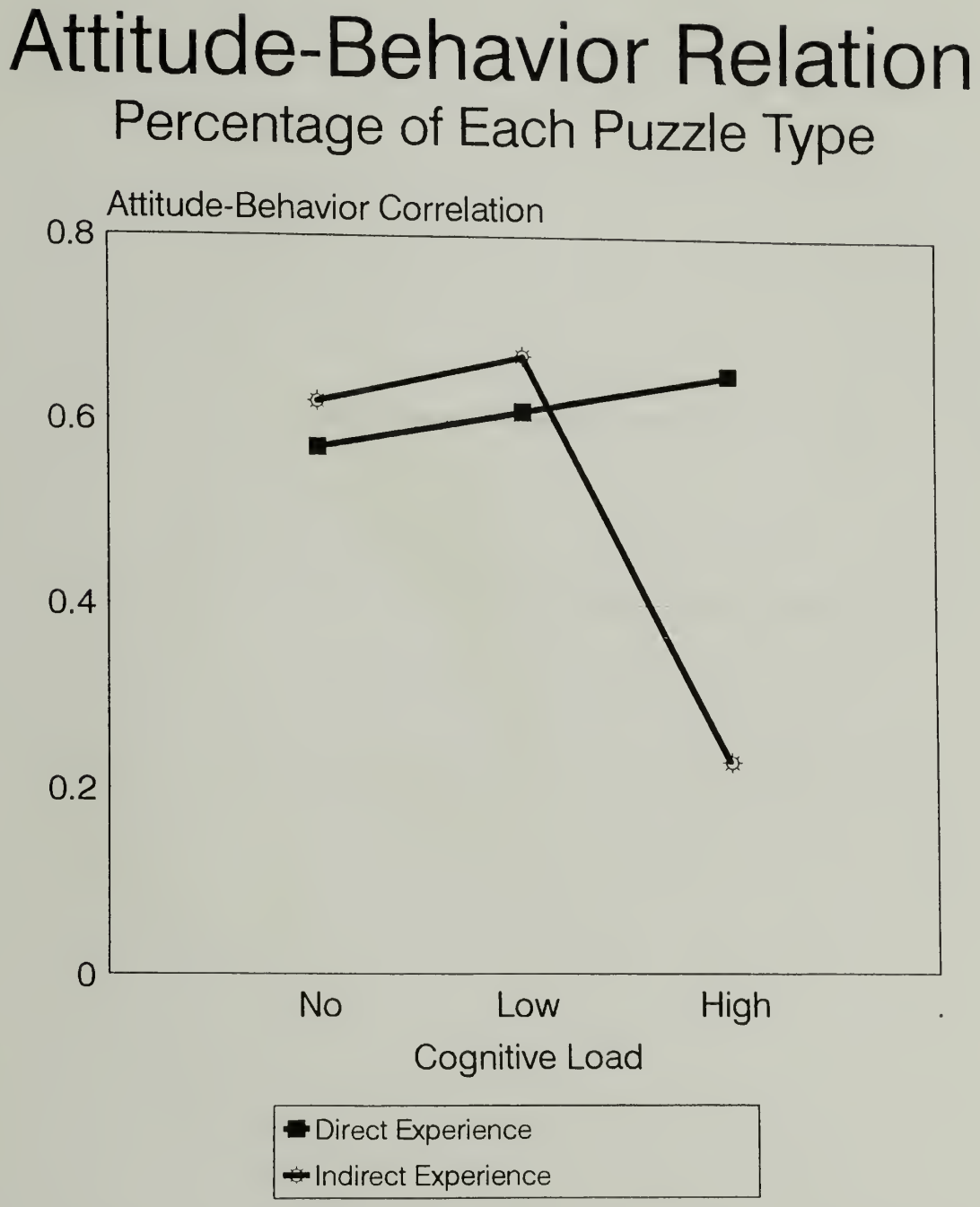


Figure 7. Attitude-Behavior Relation: Percentage of Each Puzzle Type. Correlations between pretest attitudes and subsequent behavior as related to experience and cognitive load.

attitude's accessibility in memory. Contrary to Fazio, et al., Doll and Ajzen (1992) have found that the temporal stabilities of the predictor variables, rather than their accessibility, serve as strong mediators of the attitude-behavior relation.

In order to test for a mediating role of attitude stability in the present study, the transformed attitude-behavior correlations were submitted to 2 (type of experience) x 3 (level of cognitive load) MANOVAs with temporal stability of subjects' attitudes treated as a covariate. Attitude stability was measured by computing the within-subject correlations between the pre- and posttest measures of subjects' attitudes across the five puzzles. Baron and Kenny (1986) have suggested that if, as a result of controlling for a possible mediating variable, the effect of an independent variable upon a dependent variable is reduced to nonsignificance, then mediation can be assumed. Initially, the correlation between attitude and order of puzzle completion produced a main effect of Experience and an Experience x Cognitive Load interaction. Controlling for attitude stability eliminated the main effect of Experience $F(1, 76) = 1.04$, $p<.312$, although the interaction remained significant $F(1, 76)) = 3.90$, $p<.025$. The relation between attitude and percentage of each type of puzzle completed was not significant in the initial analysis so possible mediating effects of stability could not be established. It is unclear why stability served to eliminate the main effect of Experience involving order of puzzle completion, while not diminishing the Experience x Cognitive Load interaction, but it appears that stability is not the only variable mediating subjects' attitude-behavior relations.

Predictions of Intentions and Behavior

Although not directly relevant to our hypothesis, we examined the ability of the theory of planned behavior to predict game behavior and intentions across experimental conditions. Three average within-subject correlation matrices, two for behavior and one for intentions, were submitted to multiple regression analyses. Both the percentage of each type of puzzle completed, as well as the order in which subjects worked on the puzzles, were regressed on the pretest measures of perceived behavioral control and intentions. Subjects' intentions to play with the puzzles were regressed on pretest attitudes, subjective norms, and perceived behavioral control.

After testing for internal consistency, the multiple indicators for each of the variables of the theory of planned behavior were averaged to produce overall measures of subjects' behavioral intentions, subjective norms, general attitudes, and perceived behavioral control. These variables were submitted to multiple regression analyses.

The results of the multiple regression analyses provide good support for the theory of planned behavior. In the prediction of percentage of each type of puzzle completed, the multiple correlation was .66 ($p<.0000$), with both intentions ($b = 1.04$, $p<.0000$) and perceptions of behavioral control ($b = -.58$, $p<.0008$) making significant contributions to prediction. When order of puzzle completions served as the dependent variable, the multiple correlation was .29 ($p<.07$). The marginal result for order is not surprising, as the pretest questions assessing

intention and perceived behavioral control related to preferences for working on the different puzzles, not the particular order in which the subject would choose to work.

When predicting intention, the multiple correlation was .94 ($p<.0000$) with perceived behavioral control ($b = .38$, $p<.0001$) and attitude ($b = .58$, $p<.0000$) making significant contributions to prediction. The third variable, subjective norms, did not enter significantly into the regression equation ($b = .07$, $p<.43$). Due to the fact that the intention we were predicting related to puzzle choice, it is reasonable to assume that subjects' beliefs concerning important others' expectations regarding their behavior may not have been particularly relevant in this situation. Overall, though, the theory of planned behavior served as a good framework for predicting both intentions and behaviors.

CHAPTER IV

GENERAL DISCUSSION

The present study was an attempt to examine the effects of direct vs. indirect experience on the attitude-behavior relation in the automatic and reasoned modes of processing information. We presented two opposing theories concerning the influence of type of experience on subsequent attitude-behavior relations. The Ajzen and Fazio models both predicted a main effect of Experience such that subjects in the direct experience condition would show a significantly stronger attitude-behavior relation than subjects in the indirect experience condition, and this effect was found. Both the Ajzen and Fazio models predicted a main effect of Cognitive Load. This effect was not found. Finally, both models predicted an Experience x Cognitive Load interaction, but whereas the Ajzen model predicted that direct experience would have a greater effect on the attitude-behavior relation for attitudes retrieved under no and low cognitive load conditions, Fazio's model predicted that direct experience would have a greater effect on attitudes retrieved under high cognitive load conditions. The interaction found lends support to Fazio's model; attitude-behavior relations were found to be highest for direct experience subjects in the high cognitive load condition. It must be noted, however, that while significant results were found in the high cognitive load condition, our automatic processing condition, the attitude-behavior relations of our direct and indirect experience subjects did <u>not</u> differ in the no and low cognitive load conditions, our reasoned action conditions. These

findings are contrary to past research examining the effects of type of experience in the reasoned mode of processing (Doll & Ajzen, 1992; Fazio, Powell, & Herr, 1983;Regan & Fazio, 1977). These studies found that direct experience improved the prediction of behavior and lowered latencies of responses to questionnaire items. Those findings were not replicated in the present study. It is possible that the instructions given to indirect experience subjects in the present study were sufficiently informative to eliminate actual differences in the attitude-behavior relations between direct and indirect experience subjects in the reasoned mode. These differences may have only had the chance to appear when subjects were placed under conditions of high cognitive load, our automatic mode of processing. Another possible explanation for the discrepancy between previous findings and our results is that the methods of previous studies may inadvertantly placed subjects in a state of distraction or stress, making these studies more similar to our high cognitive load condition. If this were the case, our results would be consistent with past studies.

Fazio and his associates (Fazio, Chen, McDonel, & Sherman, 1982; Fazio, Powell, & Herr, 1983; Sherman, et al., 1982) have suggested that the primary variable mediating the effects of experience is the accessibility of subjects' attitudes. In these studies, accessibility has been conceptualized as the latency of subjects' responses to attitudinal questions. Their findings have indicated that subjects who had received direct experience regarding an attitude object responded more quickly to questions concerning that object than subjects who had

received indirect experience. This was not the case in the present study. Controlling for individual differences in filler latencies, analyses revealed a main effect of Time wherein subjects' latencies were longer on the pretest than the posttest, and a main effect of Experience wherein direct experience subjects responded more slowly than indirect experience subjects. The main effect of Time can most likely be attributed to an overall practice effect, but it is unclear why direct experience subjects responded more slowly than indirect subjects to attitudinal questions regarding the puzzles. One possibility is that direct experience subjects may have felt more involved in the task, and therefore took more time to answer the questions. In future research, the inclusion of a question concerning how involved subjects feel with the task would prove useful. Regardless, although the analysis of the attitude-behavior relation data seem to support Fazio's general theory, accessibility, at least in the present study, does not appear to be the crucial mediating variable of the effects of experience.

Ajzen and Doll (1992) have suggested that, rather than accessibility, stability of the attitude serves as an important mediating variable of the effect of experience on the attitude-behavior relation. Using a strategy suggested by Baron and Kenny (1986), the effects of cognitive load and type of experience on the attitude-behavior relation were examined while controlling for attitude stability. Results indicated that although stability reduced and even eliminated some of the previously significant effects, it was not able to reduce all of the effects to

nonsignificance. Thus, accessibility and stability as well other possible mediators such as confidence should be examined further in future research.

One puzzling finding in the present study was that indirect experience subjects felt more informed about the puzzles than direct experience subjects. Under conditions similar to our no and low cognitive load condition, Regan and Fazio (1977) found no difference between subjects in the direct and indirect experience conditions in how informed they felt about the various types of puzzles. A possible explanation presented earlier suggests that because indirect experience subjects had only superficial exposure to the puzzles, they would not have been fully aware of the intracacies involved in solving the puzzles. Therefore, indirect experience subjects were not reticent to indicate that they felt informed about the puzzles. Alternatively, direct experience subjects, having had first-hand experience with the puzzles, felt more aware of the gaps in their knowledge about the puzzles, and therefore indicated feeling less informed. It would have been useful if we had included a follow-up question on the posttest questionnaire regarding how informed subjects felt about the puzzles. This information might have allowed us to examine whether differences based on initial experience with the puzzles persisted once all subjects had received direct experience with the puzzles.

Further research should be directed at the placement of the cognitive load manipulation within the experimental paradigm. It would be interesting if the cognitive load manipulation could have been delivered during the recording of subjects' attitudinal responses on the computer. Our manipulation was given,

instead, during the behavioral response period, as it was determined that the cognitive load manipulation could overly interfere with the recording of subjects' response latencies. In future, latency measures could be recorded separately from the attitudinal measures as in the work by Fazio, Powell, and Williams (1989). Fazio et al. recorded subjects' response latencies by asking them to respond as quickly as possible to a simple "like - dislike" judgment concerning the attitude objects. Following this task, subjects completed a second questionnaire asking them to make attitudinal ratings on a 7-point scale ranging from *extremely bad* to *extremely good.* This type of procedure would allow us to examine the relation between attitudes and behavior when the initial attitudes were generated under conditions of cognitive load.

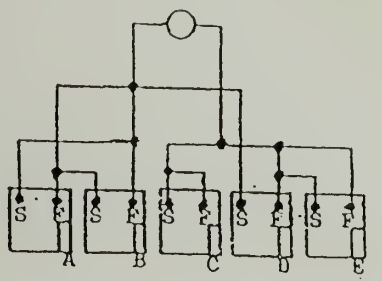
In sum, the results of the present study suggest that direct experience plays an important role in strengthening subjects' attitude-behavior relations, particularly in the automatic processing mode. The results are encouraging with respect to our ability to examine the automatic processing mode in the laboratory. Further research must be conducted in order to explore the variables mediating the effects of experience.

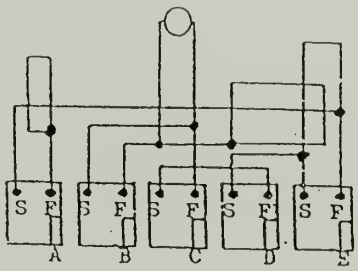
APPENDIX A
EXAMPLES OF PUZZLES

CHOOSING A PATH

In the picture below is a box with dots marked S (starting point) and F (finish point). You are to follow the line form S, through the circle at the top and back to F. Each picture contains five boxes. Only one box will have a line from the S, through the circle, and back to the F in the same box. Dots on the lines show the only places where connections can be made between lines. If lines meet or cross where there is no dot, there is no connection between the lines.

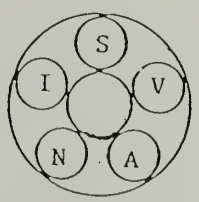
Show which box has the line through the circle by blackening the space at the lower right of that box.

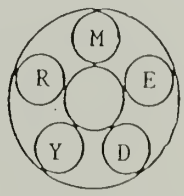


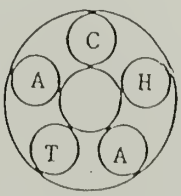


WORD DIALS

Each word dial below contains a word, but one letter is missing. When you determine the missing letter, enter it into the center of the dial. Then you will be able to spell a word in a clockwise direction.

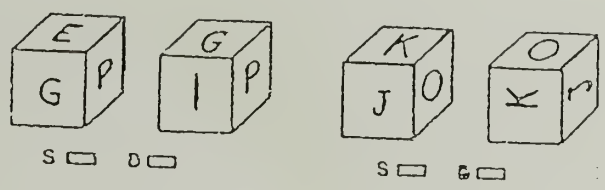






CUBE COMPARISONS

In each problem examine the pair of cubes. A specific symbol (letter, numeral or geometric shape) can appear only once on any individual cube. Blacken D if the two drawings must be different cubes. Blacken S if the two drawings can represent the same cube.



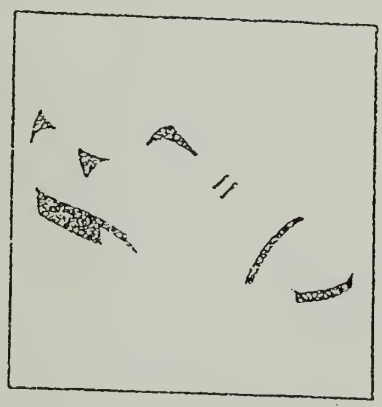
SQUARES

Each of the squares contains an 8-letter word. It can be found by starting at one of the letters and reading either clockwise or counterclockwise. When you have determined the word, write it on the line provided beneath the puzzle.

V I E	L I N	E R A
E C	E G	T R
C O N	E N K	I L Y
_____	_____	_____

GESTALT COMPLETION

This is a test of your ability to perceive a whole picture even though it is not completely drawn. You are to use your imagination to fill in the missing parts. Look at each incomplete picture and try to see what it is. Write on the line beneath it a word or a few words telling what the picture is.



APPENDIX B
SAMPLE QUESTIONNAIRE*

I feel very informed about how to work on gestalt completions:

1	2	3	4	5
very untrue				very true

I feel very informed about how to work on letter series:

1	2	3	4	5
very untrue				very true

I feel very informed about how to work on cube comparisons:

1	2	3	4	5
very untrue				very true

I feel very informed about how to work on choosing a path:

1	2	3	4	5
very untrue				very true

I feel very informed about how to work on nearer point:

1	2	3	4	5
very untrue				very true

I like to spend time playing outside:

1	2	3	4	5
very untrue				very true

The idea of playing outside to me is:

1	2	3	4	5
extremely unpleasant				extremely pleasant

Working on gestalt completions will be:

1	2	3	4	5
extremely unpleasant				extremely pleasant

Working on letter series will be:

1	2	3	4	5
extremely unpleasant				extremely pleasant

Working on cube comparisons will be:

1	2	3	4	5
extremely unpleasant				extremely pleasant

Working on choosing a path will be:

1	2	3	4	5
extremely unpleasant				extremely pleasant

Working on nearer point will be:

1	2	3	4	5
extremely unpleasant				extremely pleasant

I find my classes at school to be:

1	2	3	4	5
extremely unpleasant				extremely pleasant

I think that my classwork is:

1	2	3	4	5
extremely difficult				extremely easy

Working on gestalt completions will be:

1	2	3	4	5
extremely boring				extremely interesting

Working on letter series will be:

1	2	3	4	5
extremely boring				extremely interesting

Working on cube comparisons will be:

1	2	3	4	5
extremely boring				extremely interesting

Working on choosing a path will be:

1	2	3	4	5
extremely boring				extremely interesting

Working on nearer point will be:

1	2	3	4	5
extremely boring				extremely interesting

I have had a lot of previous experience working on a computer:

1	2	3	4	5
very untrue				very true

Working on the computer for me is:

1	2	3	4	5
extremely unpleasant				extremely pleasant

The experimenter would especially approve of my working on gestalt completions:

1	2	3	4	5
extremely unlikely				extremely likely

The experimenter would especially approve of my working on letter series:

1	2	3	4	5
extremely unlikely				extremely likely

The experimenter would especially approve of my working on cube comparisons:

1	2	3	4	5
extremely unlikely				extremely likely

The experimenter would especially approve of my working on choosing a path:

1	2	3	4	5
extremely unlikely				extremely likely

The experimenter would especially approve of my working on nearer point:

1	2	3	4	5
extremely unlikely				extremely likely

I am happy that I chose to attend UMASS:

1	2	3	4	5
very untrue				very true

I feel that I am getting a very good education at UMASS:

1	2	3	4	5
very untrue				very true

The experimenter thinks I should work especially on gestalt completions:

1	2	3	4	5
extremely unlikely				extremely likely

The experimenter thinks I should work especially on letter series:

1	2	3	4	5
extremely unlikely				extremely likely

The experimenter thinks I should work especially on cube comparisons:

1	2	3	4	5
extremely unlikely				extremely likely

The experimenter thinks I should work especially on choosing a path:

1	2	3	4	5
extremely unlikely				extremely likely

The experimenter thinks I should work especially on nearer point:

1	2	3	4	5
extremely unlikely				extremely likely

I think that the weather in Massachusetts is very nice:

1	2	3	4	5
very untrue				very true

I would like to live in Massachusetts after I graduate from school:

1	2	3	4	5
very untrue				very true

People like me would most like to work on gestalt completions:

1	2	3	4	5
extremely unlikely				extremely likely

People like me would most like to work on letter series:

1	2	3	4	5
extremely unlikely				extremely likely

People like me would most like to work on cube comparisons:

1	2	3	4	5
extremely unlikely				extremely likely

People like me would most like to work on choosing a path:

1	2	3	4	5
extremely unlikely				extremely likely

People like me would most like to work on nearer point:

1	2	3	4	5
extremely unlikely				extremely likely

I feel that I am getting the grades I deserve in my classes:

1	2	3	4	5
very untrue				very true

The idea of studying to me is:

1	2	3	4	5
extremely unpleasant				extremely pleasant

My friends would especially approve of my working on gestalt completions:

1	2	3	4	5
extremely unlikely				extremely likely

My friends would especially approve of my working on letter series:

1	2	3	4	5
extremely unlikely				extremely likely

My friends would especially approve of my working on cube comparisons:

1	2	3	4	5
extremely unlikely				extremely likely

My friends would especially approve of my working on choosing a path:

1	2	3	4	5
extremely unlikely				extremely likely

My friends would especially approve of my working on nearer point:

1	2	3	4	5
extremely unlikely				extremely likely

I am the type of person who worries about the grades they get in class:

1	2	3	4	5
very untrue				very true

I find that I already know a lot of the material that is covered in my classes:

1	2	3	4	5
very untrue				very true

For me, working on gestalt completions will be:

1	2	3	4	5
extremely difficult				extremely easy

For me, working on letter series will be:

1	2	3	4	5
extremely difficult				extremely easy

For me, working on cube comparisons will be:

1	2	3	4	5
extremely difficult				extremely easy

For me, working on choosing a path will be:

1	2	3	4	5
extremely difficult				extremely easy

For me, working on nearer point will be:

1	2	3	4	5
extremely difficult				extremely easy

I spend a lot of time talking with my friends:

1	2	3	4	5
very untrue				very true

I like to spend a lot of time by myself:

1	2	3	4	5
very untrue				very true

I will be able to work successfully on gestalt completions:

1	2	3	4	5
extremely unlikely				extremely likely

I will be able to work successfully on letter series:

1	2	3	4	5
extremely unlikely				extremely likely

I will be able to work successfully on cube comparisons:

1	2	3	4	5
extremely unlikely				extremely likely

I will be able to work successfully on choosing a path:

1	2	3	4	5
extremely unlikely				extremely likely

I will be able to work successfully on nearer point:

1	2	3	4	5
extremely unlikely				extremely likely

I find that my mind wanders when I am doing my schoolwork:

1	2	3	4	5
very untrue				very true

I am the type of person who likes to finish my schoolwork ahead of time:

1	2	3	4	5
very untrue				very true

I intend to work on gestalt completions in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

I intend to work on letter series in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

I intend to work on cube comparisons in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

I intend to work on choosing a path in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

I intend to work on nearer point in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

I am not very interested in extracurricular school activities:

1	2	3	4	5
very untrue				very true

I really enjoy attending sports events a UMASS:

1	2	3	4	5
very untrue				very true

I am planning to work on gestalt completions the most often in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

I am planning to work on letter series the most often in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

I am planning to work on cube comparisons the most often in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

I am planning to work on choosing a path the most often in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

I am planning to work on nearer point the most often in the time provided:

1	2	3	4	5
extremely unlikely				extremely likely

In general, I really like working on puzzles:

1	2	3	4	5
very untrue				very true

I spend a lot of time playing with puzzles in my spare time:

1	2	3	4	5
very untrue				very true

I feel confident about my judgments concerning gestalt completions:

1	2	3	4	5
very untrue				very true

I feel confident about my judgments concerning letter series:

1	2	3	4	5
very untrue				very true

I feel confident about my judgments concerning cube comparisons:

1	2	3	4	5
very untrue				very true

I feel confident about my judgments concerning choosing a path:

1	2	3	4	5
very untrue				very true

I feel confident about my judgments concerning letter series:

1	2	3	4	5
very untrue				very true

I feel good about the idea of working on these types of puzzles in the free play period:

1	2	3	4	5
very untrue				very true

* order of puzzle within each type of question will be randomized

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